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SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE

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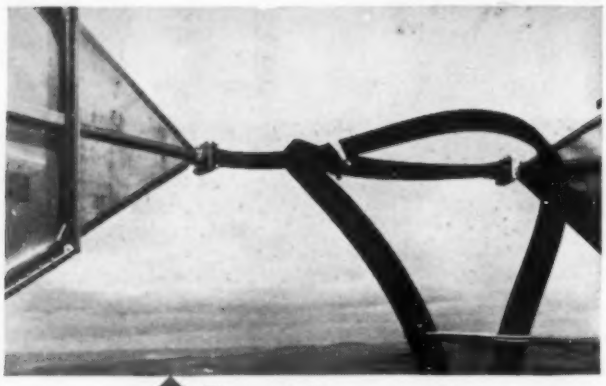
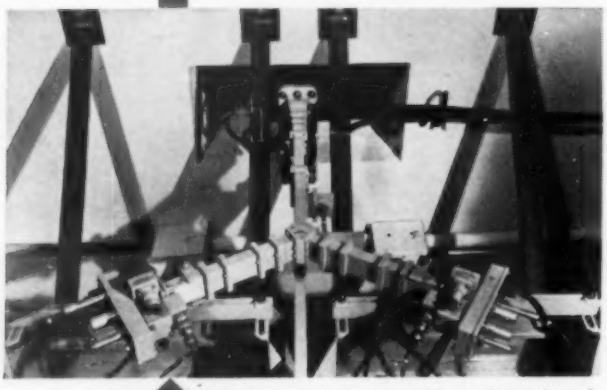
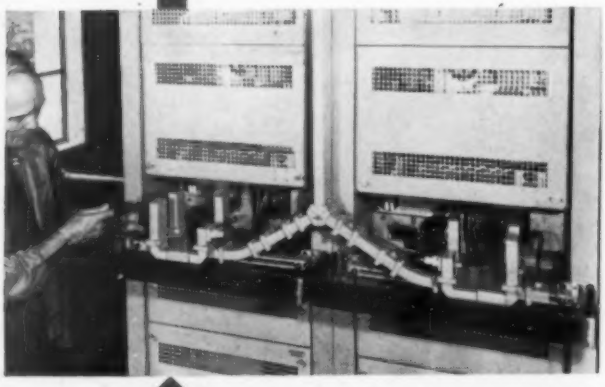
A SCIENCE SERVICE PUBLICATION



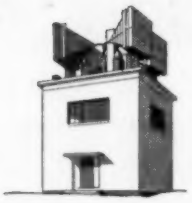
3 The waveguide connects with horn antennas which are pointed toward similar antennas at the next stations miles away.



2 Looking upward, the waveguide continues through the roof of the station toward the antennas.



1 Base of a waveguide circuit in a repeater station of the New York-Boston radio relay system.



Pipe Circuits

UNLIKE radio broadcast waves, microwaves are too short to be handled effectively in wire circuits. So, for carrying microwaves to and from antennas, Bell Laboratories scientists have developed circuits in "pipes," or waveguides.

Although the waves travel in the space within the waveguide, still they are influenced by characteristics found also in wire circuits, such as capacitance and inductance. The screw or stud projecting inside the guide wall acts like a capacitor; a rod across the inside, like an inductance coil. Thus transformers, wave filters, resonant circuits — all have their counterpart in waveguide fittings. Such fittings, together with the connection sections of waveguide, constitute a waveguide circuit.

From Bell Laboratories research came the waveguide circuits which carry radio waves between apparatus and antennas of the New York-Boston radio relay system. The aim is to transmit wide frequency bands with high efficiency—band widths which some day can be expanded to carry thousands of telephone conversations and many television pictures.

Practical aspects of waveguides were demonstrated by Bell Telephone Laboratories back in 1932. Steady exploration in new fields, years ahead of commercial use, continues to keep your telephone system the most advanced in the world.

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PSYCHOLOGY

New Light on Mental Ill

A physiological difference has been found between normal persons and schizophrenics which centers about the response of the adrenal glands to stress.

➤ TWO SMALL GLANDS above the kidneys and one at the base of the brain may hold the key to a medical treatment for the mental disease, schizophrenia.

Among those engaged in the research, believed the first ever to show clear cut physiological differences between normal persons and psychotics, are: Dr. Gregory Pincus, director of laboratories of the Worcester Foundation for Experimental Biology in Worcester, Mass.; Dr. Hudson Hoagland, executive director of the Foundation; Dr. Harry Freeman, an endocrinologist associated with the group; and Fred Elmadjian, a physiologist.

Their work casts a new light on the mental disease known as schizophrenia. A schizophrenic is a person who is living in a waking dream state. He has lost contact with reality and cannot disentangle external events from those which take place in his dream world. One half of the beds in mental hospitals are occupied by schizophrenics.

The glandular differences between normals and schizophrenics center about the response of the adrenal glands reacting to stress. The adrenals are two small glands located on top of the kidneys. When a normal person is subjected to stress—any sort of stress from breathing air with a low oxygen content to waking up in the morning—the adrenal glands send out an increased flow of chemical messengers into the bloodstream.

These messengers are known as adrenal cortical hormones. They are vital to life, since they control such functions as the use of fuel by the body and storage of sugar by the liver.

The schizophrenic shows no appreciable increase in adrenal output in response to stress. Furthermore, his physiological behavior is different from normal in another important respect.

The adrenals also regulate the use of sodium and potassium salts by the brain and other body tissues. In the normal person, the body's potassium output is increased after stress, but in schizophrenics no such change is noted. This may indicate that a psychotic's brain does not undergo the same chemical responses as that of a normal person.

These isolated facts are the first scientific demonstrations of an abnormal physiology in mental patients. They may lead to the discovery of important physical differences between normals and schizophrenics.

The implication is therefore that the research in Worcester may be the first step in the eventual development of a physiological method of treatment for mental disease.

A further discovery has been made, narrowing down the area of search for the defective mechanism in the schizophrenic. It involves control of the adrenals by the pituitary, a small gland located at the base of the skull. In order for the adrenals to respond to stress, they must first receive a message from the pituitary in the form of a hormone known for short as ACTH, which is adrenocorticotrophin when spelled out in full. In answer to this message, adrenal cortical hormone is secreted into the blood by normal persons. The question in the case of schizophrenics was whether the actual deficiency lay in maladjustment of the adrenals or in the failure of the pituitary to send out ACTH.

To answer this problem, the scientists injected ACTH into the bloodstream of psychotic patients, and then measured the adrenal cortical hormone output. The fact that no increase in output was measured shows that the mechanism of adrenal output is at fault, and therefore, in all probability, the delicate operation of the adrenal glands has been in some way impaired in schizophrenics.

The breakdown of the adrenals results not only in effects on the salt and fuel economy of the brain, but also destroys general ability of the body to adapt to an ever-varying environment. For that reason, a schizophrenic cannot react to the constantly changing demands of daily life.

The why and how of this adrenal impairment is not yet understood, but in the future of research in this field may lie the eventual solution of one of the most serious problems of our civilization—mental disease and its treatment.

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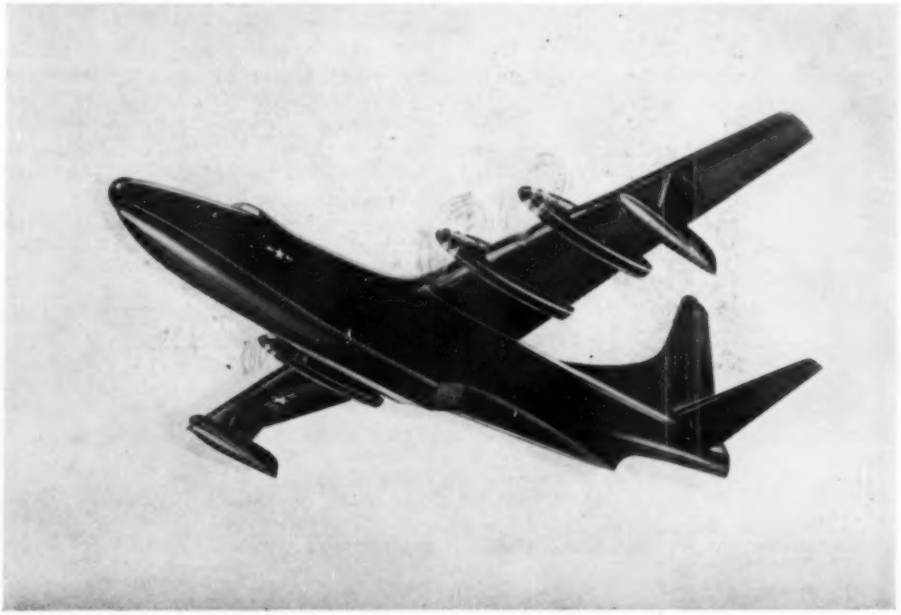
BOTANY

Green Plants' Evolution

➤ EVIDENCE that green plants are the climax of a long line of evolution toward self-sufficiency in the use of the energy of the sunshine is being presented in national Sigma Xi lectures throughout the country by Dr. C. B. van Niel of Stanford University's Hopkins Marine Station at Pacific Grove, Calif.

Dr. van Niel, who is professor of microchemistry and an authority on photosyn-



PATROL FLYING BOAT—This is an artist's conception of the XP5Y-1, two of which are being built for the U. S. Navy by Consolidated Vultee Aircraft Corp. of San Diego. It has a quick take-off and high speed due to its four powerful, propeller turbine, Allison engines and is designed for long-range day and night search of sea areas, rescue operations, and anti-submarine patrol. The first experimental XP5Y-1 is expected to fly early in 1949.

thesis, is speaking before chapters and clubs of the Society of the Sigma Xi, the Scientific Research Society of America.

Modern plants, with their green chlorophyll, utilize the energy of the light from the sun to break down molecules of water. They build the hydrogen thus obtained, along with the carbon dioxide they take from the air, into their plant structures. The oxygen they discard in this process maintains the balance of nature and the constitution of the air.

The earliest plants, Dr. van Niel is telling his scientific audiences, could not have made use of this complicated process which combines two radically different mechanisms: First, the photochemical reaction; second, the liberation of molecular oxygen.

Evidence has been found, Dr. van Niel reports, that certain purple bacteria make use of a simpler kind of photosynthesis. This method may have preceded that which takes place in the green chlorophyll. It is accomplished by a photochemical decomposition of water as in green plants. In both types of photosynthesis the hydrogen is transferred to carbon dioxide. But only in green-plant photosynthesis is oxygen evolved. In bacterial photosynthesis an oxidation product other than oxygen takes its place, and this must be continuously reduced. That requires the simultaneous oxidation of a reducing substance, for example a secondary alcohol. All these reactions take place under the influence of various enzymes.

It is reasonable, Dr. van Niel found, to regard the evolution of photosynthesis as proceeding from organisms with highly developed synthetic mechanisms but not yet endowed with photochemically functional pigment systems.

The pathway of development would then lead in the direction shown by the mechanisms in use by the purple bacteria. Their pigment systems were present in their colorless ancestors, but they were not yet independent of extraneous reducing chemicals.

"The next step in the evolutionary sequence," Dr. van Niel reports, "would then be concerned with changes whereby the 'oxidation product' of the photochemical reaction becomes capable of self-regeneration through the elimination of molecular oxygen. This is the mechanism operative in green plants."

"Interpreted in this manner, green plant photosynthesis appears as the ultimate result of that line of physiological evolution which represents the gradual development of synthetic mechanisms, and in which the organisms become progressively more independent of an external supply of reducing substances. Only with green plant photosynthesis has complete independence been acquired."

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Letters To The Editor

Autumn's Colors

If many readers of the SCIENCE NEWS LETTER are like myself they are curious to know what are the causes and contributing factors resulting in "Golden, crimson, purple, russet, scarlet—autumn's brave banners . . ."—J. Edward Johns, Columbus, Ohio.

The yellows and orange-reds in autumn leaves are due to the presence of a group of pigments known collectively as the xanthenes. Carotene, which gives carrots, rutabagas, squashes, etc., their characteristic color, is one of the xanthenes. The purples and deep crimsons are due to another group of pigments, the anthocyanins, which are also responsible for the colors of such things as purple cabbage, beets, and red-foliaged ornamental plants.

The xanthenes are present all the time, but are covered up by the more abundant green pigment, chlorophyll. As autumn advances, the chlorophyll dies and loses its color, while the xanthenes remain. Formation of the anthocyanins is promoted by the clear, sunny weather of the "Indian summer" type, cool but not frosty. Frost, if it comes too early in autumn, actually prevents the development of good autumn coloration.

The outside influences that set the leaves on the way towards their autumnal glory are complex, hence not well understood. They are not unlike the complex of causes that produce the ripening of fruit; indeed, an autumn-colored leaf might well be regarded as a RIPE *leaf rather than as a dead one.*

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PSYCHOLOGY

Belligerency Not Inborn

Warlike tendencies in mankind are acquired, an international group of social scientists believe. Science may help to maintain peace.

► SCIENCE is often blamed for causing war. The answer is: Man, not knowledge, causes war. Consider the combative cavemen or the death-to-death struggles between the ancients before the dawn of modern science.

War can be avoided and peace maintained by using the methods and knowledge of science. That is the belief of those who have been working on the problem.

"War is not born into men; it is built into men." Two thousand American psychologists in 1945 agreed that "no race, nation or social group is inevitably warlike."

An international group of social scientists summoned this year by UNESCO put it this way:

"There is no evidence to indicate that wars are necessary and inevitable consequences of 'human nature' as such. The problem of peace is the problem of keeping group and national tensions and aggressions within manageable proportions and of directing them to ends that are at the same time personally and socially constructive so that man will no longer seek to exploit man."

Scientists in arguing the usefulness of science in maintaining the peace are not suggesting that they should take over the day-to-day international relations job from the diplomats or that they should replace the military commanders. They do believe that they can and do help both the diplomats and the military in very practical ways so far as they are allowed.

Science and technology constitute the one field of human endeavor that is most truly international. They provide bridges between peoples, nations and ideologies that art, music, religion and business cannot furnish.

One of the tasks of UNESCO (United Nations Educational Scientific and Cultural Organization) is to apply science to the international scene. When the U. S. National Commission for UNESCO met recently in Boston there were suggestions of immediate as well as long-time contributions of science to world peace.

Dr. Arthur H. Compton, Nobelist in physics and chancellor of Washington University, St. Louis, listed science's human values and the insistence on freedom and honesty as major contributions to world peace.

Freedom and honesty are basic to science and at the very heart of the democracy of free peoples. Yet Dr. Compton distinguished between a state of cooperation undisturbed by war and a peace that gives satisfactory life to free peoples. All Americans, he said, are more concerned with the maintenance of human freedom than even with peace. Science, he recognized, could be used to produce the peace of serfdom instead of freedom. This would happen if the Eastern instead of the Western political pattern were permitted to become dominant.

Science naturally develops on a world-wide front and provides all nations with natural channels to and from their neighbors. Dr. Compton considers the encouragement of the growth of science and technology throughout the world as the most powerful existing force working toward world peace.

Is there enough time for this force to operate? That is a major question. War would torpedo the world organization necessary to apply science and technology to food, transport, energy and other such requisites. For these reasons alone, war would be a crime against civilization.

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ENGINEERING

Cadmium Mercury Lamp

► A NEW TYPE of mercury vapor lamp, designed for use in motion picture studios to replace the carbon arc lamp now employed, was demonstrated to the Society of Motion Picture Engineers in Washington. It is actually a cadmium-mercury lamp, in which a small amount of cadmium is added to the mercury.

Adding the cadmium to the mercury inside its rugged quartz bulb adds enough red and other colors to the light to make it suitable for color movies. The experimental lamp produces high-power light which streams from a high-pressure arc which, although only as long as a peanut, is about half as bright as the sun.

This short-arc lamp was one of several experimental mercury types demonstrated by Eugene W. Beggs of the Westinghouse Lamp division, Bloomfield, N. J. He dubbed it a 10,000-watt "cantaloupe" of quartz, and the brightest cadmium mercury light ever made in America. While it rivals the carbon arc in brilliance, it will add to studio comfort because it is cool, radiating only a minimum amount of heat.

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HIGH POWER LIGHT—The experimental 10,000-watt movie lamp which is for direct current operation is shown at the left and a similar lamp for alternating current circuits is at right.

PSYCHOLOGY

Mind Affected by Fear

➤ FEAR AND SUSPICION can turn even wild rats into abject "strap-hangers." These anxious animals stand on their hind legs by the hour, hanging like subway riders onto wires at the top of their cages. Even when their cages are left open, they make no attempt to escape. One animal even developed what would be called thumb-sucking in a child.

These strap-hanging rats just stand motionless with their noses thrust through the wire mesh of their cages, eyes fixed straight ahead. And they keep this posture for months, except when they are disturbed or when they eat or drink. Then they run around the cage a few times and go right back to their awkward pose.

The fear that drove the animals into this psychotic state was the fear of food poisoning, Dr. Curt P. Richter, of Johns Hopkins Hospital, told the Mooseheart Symposium on Feelings and Emotions at the University of Chicago.

If such a simple fear can produce such abnormal behavior in wild rats, what will mutual fear and suspicion between nations do to the minds of men in the countries involved in this atomic age, the scientific men at the meeting were speculating?

Dr. Richter is the scientist who, in the course of psychological experiments on the rat's ability to taste, discovered the potent rat poison ANTU. The terrified rats were some that had survived poisoning with ANTU or other poison which had made them very ill.

In later experiments, they were given a choice of eating from either of two food cups. One contained the poisoned food, the other was safe. It was found that the rats could recognize the poisoned food. But, nevertheless, they became suspicious of the unpoisoned food as well. This fear and suspicion is what led to their abnormal behavior.

The strange behavior developed in five out of 30 rats used in the poison experiments.

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Tension Sweeps Mobs

➤ THE POPULAR IDEA that crowds or mobs are always so swept away by emotion that they are incapable of rational behavior is a fallacy and should be abandoned, Dr. Franklin Fearing, of the University of California, told the same meeting.

The idea that the group generates an irrational mind or spirit is a notion that was abandoned by psychology in the 1920's, he said. It tends to de-value all collective behavior, and hence is a barrier to the understanding of the full creative possibilities of group action in a democracy.

It would be much better, Dr. Fearing suggests, to give up the use of the term emotion or emotionality as applied to crowds and substitute the concept of "tension."

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PSYCHOLOGY

Neurosis from Monotony

➤ SHEEP and goats do not worry as we do, but monotony and a rigid time schedule can drive them into a nervous breakdown. This is what Dr. H. S. Liddell of Cornell University has observed in animal experiments reported to the Mooseheart Symposium on Feelings and Emotions in Chicago.

Their state of chronic, unrelieved tension may be severe enough, Dr. Liddell found, to alter their behavior not only in the laboratory, but in the pasture and the barn for years or for life.

The animal neurosis developed in the course of classical experiments on conditioning first developed by the Russian psychologist Pavlov.

The animal, put into a harness during his daily training, soon learns to control his restlessness and to remain quiet in spite of occasional mild electric shocks on the foreleg. If the shock is regularly preceded by a signal, the animal soon learns to flex his foreleg in anticipation of the shock that is to follow. He will "remember" to do this for at least three years without practice.

All this is harmless enough. But a neurosis is brought on when the shocks are given with monotonous adherence to a strict time schedule.

If the shocks are applied every two minutes exactly, the animal "freezes" into a state of rigidity like that which physicians see in humans sometimes and call "conversion hysteria."

If the shocks are separated by a constant time interval of five, six or seven minutes, the result is a chronic state of diffuse agitation. In the first case the heart rate is slow, in the second it is rapid and irregular.

Even when the animal is given complete freedom of movement during the experiment, the shocks at regular two-minute intervals will make him go and stand rigidly against the wall exactly as if he were held in the position with the restraining harness.

The presence of his mother may protect a young animal from the psychological danger of this monotonous regimen, it was found. Twin goats a few weeks old were subjected to the experiment using two-minute time intervals. One was alone in the room when the test took place. The other had his mother's company. The solitary twin developed neurotic manifestations; the other was saved by his mother's presence.

"In our culture," Dr. Liddell said, "the demand for precision of psycho-motor skills and the monotony involved in their co-operative exercise may, we believe, endanger the functional integrity of the nervous system. Our program of investigation may aid in discovering a prophylaxis for the necessary evils of our present mechanical, rigidly time-structured mode of living."

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BIOCHEMISTRY

Adding Special Sugar Helps Body Utilize Fats

➤ FORTIFYING butter, oleomargarine and other fats by adding a special sugar to them may become the next step toward improving our diets, if research by Dr. Curt P. Richter of the Johns Hopkins Medical School in Baltimore proves applicable to humans.

Rats, Dr. Richter finds, make much better use of fat as nourishment when they have a little of the special sugar to go with the fat. The special sugar is galactose. It is found in milk sugar and can be converted to lactose.

The studies bring out a hitherto unsuspected relationship between fat and galactose. The findings also reverse some by other scientists who reported a few years ago that fat played an important part in the utilization of galactose.

Dr. Richter's studies, reported in the journal, SCIENCE (Oct. 22), were made by the "single food choice" technique. Rats of standard weight and under standard conditions are put on a diet consisting of only one foodstuff and water. The length of time the rats survive is taken as a measure of the nourishing value of the foodstuff.

Rats on no food at all survived an average of 4.3 days. With only galactose, the special sugar, for food, the average survival was 6.2 days. On oleomargarine alone, the average survival was 32.4 days. On galactose and oleo it was 69.3 days.

The calories furnished by the sugar were not responsible for the longer survival, because rats allowed to eat as much as they wanted of both oleo and sugar ate very little of the galactose. For some animals it furnished only five percent of the total calories and some ate none at all for 15 days.

Butter was not used in the experiments because they were started during the war when not enough butter was available. Preliminary experiments with corn oil instead of oleo have so far given essentially the same results.

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PALEONTOLOGY

Reconstruct Weird Beasts

Accurate reconstruction of the appearance of a group animals from their fossil footprints has been made possible by a scientist's studies.

➤ AN ACCURATE PICTURE of weird beasts that trod the earth about 200,000,000 years ago, leaving perfect footprints on mudflats but apparently no skeletal remains, has been drawn by Dr. Frank Peabody, working in the paleontology laboratories of the University of California.

The beasts were a group of animals that ranged in size from a chicken to a dinosaur-like animal standing six feet high at the hips. The family name of Chirotherium has been given to the entire group. The name means "hand animal," because of the remarkable resemblance of the hind foot to the human hand.

How a body of scientific evidence was built up, from which Chirotherium's appearance was deduced, on the basis of the beast's "fingerprints," is recited in a new University of California publication by Dr. Peabody, who is now at the University of Kansas. In the course of his eight-year study he was able to set up criteria for determining the anatomical characteristics and general appearance of any animal on the basis of its tracks alone.

Dr. Peabody began his studies in 1938, when he was a member of a paleontology party from the University working in the sandstone beds of the Meteor Crater region of Arizona. Several trackways of Chirotherium were included in the material.

Dr. Peabody, then a graduate student, became interested in these tracks, and devoted all his graduate work to their study.

He soon found that while many studies had been made of individual tracks of Chirotherium and other animals, no systematic work had been done on a trackway, that is, three or more consecutive steps.

So he began several years of painstaking work by studying the trackways of all living salamanders. He took trackways of salamanders in their usual environment, and he made the animals walk across smoked paper and laboratory mudflats.

He analyzed the characteristics of the foot, the length and width of stride, orientation of feet, tail marks. He studied a number of other factors, such as what he calls pace angulation, the angle formed by three consecutive steps.

As a result, he found that he could establish criteria by which he could classify all living salamanders on the basis of trackways alone, determining their size, length of body, height, weight, etc. His next step was to compare living salamander tracks with 20,000,000-year-old fossilized salamander tracks taken from an old gold mine in the Sierra Nevada. He found no significant changes in salamanders during the past 20,000,000 years. He extended his studies to living mammals and reptiles.

Using the "yardsticks" he had established with living and recent animals, Dr. Peabody began to work in earnest on Chirotherium. With the help of his colleagues, he excavated more trackways from the Painted Desert of Arizona.

The end result was a verification of the reconstruction of Chirotherium by a German scientist, Wolfgang Soergel, though Dr. Peabody's conclusions were based upon more solid evidence than had been available before.

Dr. Peabody's studies have made it possible to predict more accurately what the skeletal remains of Chirotherium should be like, so that scientists will be able to identify them more easily if its bones are ever found.

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PHYSICS

Spectrographic Methods Detect Traces of 1080

➤ LATTER-DAY Lucrezia Borgias may find the going tough if they use the new super-rough-on-rats, 1080, on inconvenient aunts or straying sweeties. Two new methods for detecting it in almost infinitesimal quantities were described before the meeting of the American Chemical Society in Detroit, by Dr. Charles W. Rankin of the New York State Police Scientific Laboratory at Albany.

Both methods are spectrographic, depending on the position of characteristic bright lines in the artificial rainbows made by splitting light from electrically burned specimens of material suspected of containing 1080. Both methods, Dr. Rankin stated, are capable of detecting the presence of as little as 100 micrograms of the poison.

A microgram is one millionth of a gram, or one twenty-eight-millionth of an ounce.

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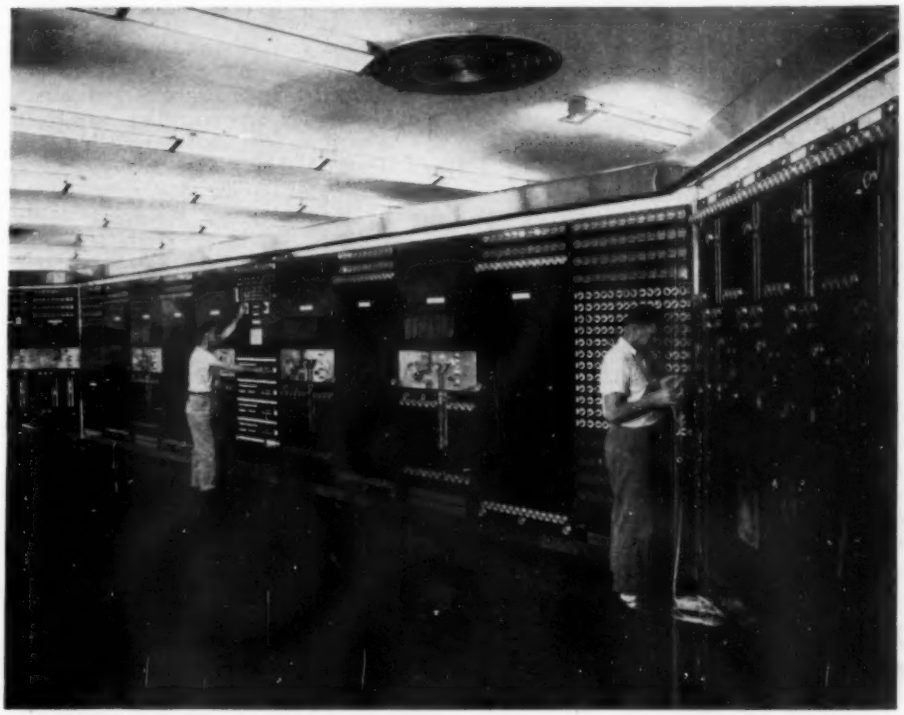

***25-TON MECHANICAL CALCULATOR**—This shows the front of the Aiken Relay Calculator installed at the Naval Proving Ground, Dahlgren, Va., for use in guided missile computations. Operator at left is at one of the control panels and man to right is in front of the specially adapted teletypes which punch out the answers on paper tape. Four sequence mechanisms allow the calculator to handle, pass on or transfer numbers at the rate of 60 per second. Addition of numbers running into the billions can be done in less than one-fifth of a second.*

MEDICINE

Bacitracin Is Now Available Commercially

➤ BACITRACIN, the antibiotic discovered in 1945, is now available commercially, but you will need a physician's prescription to get it.

The drug has proved effective in the treatment of many skin and local surgical infections, such as boils and abscesses, often making surgery unnecessary. It also checks the growth of many gram-positive streptococci and staphylococci, as well as the pneumococcus, gonococcus, meningococcus and the spirochete of syphilis.

It was isolated by Dr. Frank L. Meleney of the Columbia College of Physicians and Surgeons from the infected wound of a patient.

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BACTERIOLOGY

Photograph Bacteriophage In Act of Killing Germs

➤ HOW bacteriophages, the "germs" that kill germs, operate has been photographed with the aid of the electron microscope at the National Institutes of Health in Bethesda, Md. by Dr. Ralph W. G. Wyckoff. His report, with three of the photographs, appears in the British journal, NATURE (Oct. 23).

Contact with the bacteriophage particles apparently kills the bacteria on which they prey, causing their protoplasm to dissolve and flow out of the bacterial body. Thereupon the particles begin to "devour" it, eventually covering the loose protoplasm and increasing their number and individual size at its expense.

This "devouring" of the bacterial protoplasm by the extremely minute particles justifies the name given to bacteriophage before the invention of the electron microscope made their direct study possible. The word bacteriophage means "bacteria-eater," and the name was applied years ago to an invisible something, beyond the reach of ordinary microscopes, that caused bacteria to dissolve and disappear.

Science News Letter, November 6, 1948

CHEMISTRY

New Uses for Silicones Predicted for Near Future

➤ OILS, greases, resins, rubber and other products of the relatively recently developed silicones, a new chemical family, are sure to be followed by many new products, the American Society of Mechanical Engineers was told in New York by K. W. Given of the chemical department of General Electric, Pittsfield, Mass. Some of these new products will be available soon.

Because of the ability of the silicones to withstand extremes of heat and cold, to resist moisture and to remain unaffected by most other chemicals, some of their uses will be revolutionary, he said. Glass cloth soaked in silicone resin produces an electrical insulation which will withstand great heat, and silicone varnishes, enamels and paints produce finishes that resist acids, alkalis, fresh or salt water, oils and weather. A water-repelling silicone film will have many uses.

Silicones are made from organic compounds plus silicon, one of the earth's most plentiful elements. About 76% of the earth's crust is composed of silicon and oxygen, the components of sand. Studies of silicon chemistry have extended over several decades, but the development of the silicones and their applications was hastened by the wartime need of the armed services for a material resistant to heat, cold and chemical action.

In the manufacturing process, silicon is ground and mixed with certain chemicals in a reactor. Gas is formed, from which is made a liquid, the basis of silicone products.

Among these chemicals, Mr. Given stated, is one with a name of 31 letters, "polyorganohalogenopolysiloxanes." The vapor from one form of this liquid forms a submicroscopic water-repellent film. Porous porcelain filters treated with it will permit the passage through them of compressed air, gasoline and solvents, but not water.

Other uses for this film are for windshields, camera lenses, textiles and paper. A silicone water repellent film may some day be used to treat cloth for clothing, he said. At the end of a walk in the rain the beads of water on the clothing could be shaken off, the clothes remaining neatly pressed.

Science News Letter, November 6, 1948

MEDICINE

Medicinal Dust-Inhalation Relieves Asthma Sufferers

➤ A NEW METHOD for bringing relief to asthma sufferers and for patients with bronchial spasm not due to asthma is reported by Drs. L. R. Krasno, M. Grossman and A. C. Ivy of the University of Illinois College of Medicine and the Illinois Masonic Hospital in Chicago in the journal, SCIENCE (Oct. 29).

It consists of inhalations of Norisodrine Sulfate dust from a pocket-sized inhalator. The medicine itself, known also as Aleudrin, has previously been reported effective when given in liquid form by injection, by mouth or by inhalation in a mist. The idea of using it as a dust followed the discovery that penicillin dust was a practical and effective form of giving the mold remedy for infections of the breathing tract.

Sixteen of 24 patients were able to ward off an impending attack of asthma by whiffs of the dust, inhaled through the mouth. The other eight needed other medicines in addition to the Norisodrine.

Science News Letter, November 6, 1948

IN SCIEN

MEDICINE

Change in a Body Chemical Found to Accompany Cancer

➤ DISCOVERY that a change in the nature of a body chemical takes place during the development of one kind of cancer is announced by Drs. Christopher Carruthers and V. Suntzeff of Washington University School of Medicine, St. Louis, in the journal, SCIENCE (Oct. 22).

Heretofore scientists have found evidence only for differences in quantity of chemicals in cancerous and normal cells. The significance of these quantitative changes has been difficult to evaluate.

A change in the structure of a lipid, or fatty substance, takes place during the development of skin cancer in mice, the St. Louis scientists now announce. The change is due, they report, to a quantitative alteration of a part of the lipid material of normal and abnormally multiplying mouse skin. But the net result is a change in quality resulting in altered physical and chemical properties of the lipid.

Science News Letter, November 6, 1948

GENERAL SCIENCE

Science Clubs of America To Cooperate with UNESCO

➤ YOUNG SCIENTISTS in the nation's high schools will cooperate with students abroad in various lands under recommendations made by the natural sciences section of the U. S. National Commission on UNESCO (United Nations Educational, Scientific and Cultural Organization) at its recent Boston meeting.

International cooperation by youth of all nations in science projects will "aid international understanding and also result in the broader dissemination of information on the methods and advances of science."

Science Clubs of America, an activity of Science Service, is already directing the attention of the 15,000 science clubs in the United States and their third of a million members to the opportunity of cooperating with similar clubs abroad. Over 500 clubs abroad are affiliated with Science Clubs of America.

Plans are being made to bring clubs in America and other nations into closer contact, through the UNESCO offices in Paris and otherwise. Materials being furnished USA clubs are being sent on request to clubs in other countries.

Science Clubs International, consisting of clubs in all parts of the world and their sponsoring organizations, is in the process of formation.

Science News Letter, November 6, 1948

E FIELDS

MEDICINE

Nobel Award in Medicine Keynotes Internationalism

➤ AWARD of the Nobel Prize in medicine to Prof. Paul Mueller of Basel for his discovery of the insecticidal value of DDT reemphasizes what scientists all know but some of the rest of us may at times forget: the fact that science knows no national boundaries.

Prof. Mueller is a Swiss, and the Geigy Company for which he works is a Swiss firm. But DDT was first made by a German, Othmar Zeidler, in 1874. The prize money comes from the fortune left by a Swede, Alfred Nobel, who first made dynamite by mixing into an inert carrier the too-sensitive liquid high explosive, nitroglycerin, which was the discovery of an Italian, Ascanio Sobrero.

America figures in the story twice. The invasion of Europe by an American insect pest, the potato beetle, was one of the prime stimuli that set Prof. Mueller to searching for a more effective insecticide. Discovery of the value of DDT for this purpose, especially its effectiveness against body lice, came just in time to enable American Army sanitarians to suppress a typhus outbreak in Naples that might otherwise have become one of the worst horrors of the world's most horrible war.

The boundary-crossing benefits of DDT continue and increase. Its use to prevent disease-carrying insects from stealing intercontinental rides on aircraft and ships is now accepted routine. It also aids mightily the efforts of entomologists to prevent the spread of insect pests of cultivated plants and domestic animals. If it could only be used to delouse political heads of their crawling fears, suspicions and hatreds, the peace dream of Alfred Nobel might be measurably closer to realization.

Science News Letter, November 6, 1948

BIOCHEMISTRY

Bone Growth Studied with Radioactive Phosphorus

➤ BONE-MAKING processes in animals can now be studied more accurately through the use of radioactive phosphorus from atomic-fission piles. Newest advance along this line is reported in the journal, SCIENCE (Oct. 22), by Dr. Robert S. Siffert of Mount Sinai Hospital in New York.

Radioactive phosphorus can be fed to young animals in their diet instead of ordinary phosphorus. Its presence in the growing bones can be determined by removal of bones after the death of the animal, slicing thin sections from them, and laying these on covered photographic films until the radiations affect the sensitive emulsion just as light rays would.

Softening the bone with acid previous to slicing is a necessary part of the process. Until now, a difficulty has been that ordinary acids, such as hydrochloric, take out so much of the phosphorus that a satisfactory picture cannot be made.

Dr. Siffert has solved the difficulty by using formic acid, which is a synthetic product chemically identical with the sharp-smelling material excreted by angry ants. This takes out the hard limy substance of the bone and leaves most of the phosphorus.

Science News Letter, November 6, 1948

PHYSICS

Spectral Analysis Method Detects Bits of Uranium

➤ VERY SMALL amounts of the atomic energy atom, uranium, can be detected by a new method of spectral analysis reported to the Optical Society of America in Detroit by Dr. L. T. Steadman of the University of Rochester.

Expected to be of use in measuring uranium present in many sorts of materials, the sample is burned in the crater of an electric carbon arc and the light given off is split into its spectrum lines by a quartz spectroscope. The brightness of the uranium lines measured shows the amount of the metal present.

Science News Letter, November 6, 1948

METEOROLOGY

Fine Particles Carry Static Before Dust Storms

➤ RADIO-MESSING static runs ahead of dust storms by being carried on invisibly fine dust particles that outspeed the coarser grains, states Dr. E. W. B. Gill of Oxford University in the British scientific journal, NATURE (Oct. 9).

He observed this phenomenon as early as World War I, when he was in charge of a wireless station on the Salonika front. His aerials would start sparking violently when a dust storm was approaching, well before the palpable dust actually arrived. At that time, however, he did not have an explanation to fit the observations.

In his laboratory at Oxford he was able to demonstrate the phenomenon on a small scale by pouring sand through a funnel and observing the behavior of an electrometer attached to a small metal plate nine feet away. The sand particles accumulated charges of static electricity by friction as they fell, but this had no effect on the instrument. Shortly after the sand had been poured, however, the electrometer indicator began to move. Dr. Gill attributes this to the arrival of the invisibly fine, charged dust particles spreading outward from the poured stream of sand.

Science News Letter, November 6, 1948

OTOLOGY

"Kick-Backs" on Hearing Aids Censured by A.M.A.

➤ "KICK-BACKS" are now being offered doctors on hearing aids as well as on eyeglasses, the JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION (Oct. 30) reports.

Acceptance of such "kick-backs," or rebates, is strongly censured by the association.

Physicians in various parts of the country are being offered, and some have accepted, money from dealers for recommending particular makes of hearing aids, the journal reports.

"Such a transaction between the doctor and the dispenser of hearing aids constitutes a rebate and is in direct contravention of the stand of the American Medical Association in this matter," the journal states.

"It is degrading to the profession and commercializes the doctor who accepts such a 'kick-back.'"

The A. M. A. believes it is the dealers, not the manufacturers, of hearing aids that adopt this policy.

"A modified form of kick-back is the recent suggestion that a hearing aid dealer would sell only to patients whose ears had been examined by an otologist (a physician who specializes in care of the ears)," the journal points out. "The doctor's fee, according to this arrangement, would be paid by the hearing aid dealer. Presumably the cost would be passed on ultimately to the patient in the form of a higher price for his instrument."

Such an arrangement is also disapproved by the A. M. A. since it involves a payment from dealer to physician that might be interpreted or used as a "kick-back."

"To be beyond criticism in such a situation," the journal advises, "the payment to the doctor should be made by the patient himself, not by the dealer."

Science News Letter, November 6, 1948

PALEONTOLOGY

Turtle and Fish Fossils Dug Up in West

➤ FOSSIL BONES of sea creatures of 100,000,000 years ago were dug up in the West during the past summer and have been brought back to the Smithsonian Institution in Washington by Dr. D. H. Dunkle. Among them are the skull and jaws of a big sea turtle and the bones of several large fish that may have been distant cousins of today's tarpons.

These animals inhabited an ancient sea that stretched from Alaska to the Gulf of Mexico during Cretaceous time. Silts and sands of the old sea bottom, containing the bones dropped there when the animals died, have hardened into stone and been slowly raised to their present level, far from any ocean.

Science News Letter, November 6, 1948

BIOLOGY

Germless Animals Are Bred

The hatching of a germ-free chick from a germless laboratory egg conclusively proves that higher animals can live without microbes in the body.

By DR. FRANK THONE

➤ GERMS are not necessary to life in the higher animals. Birds can be hatched, mammals born, live their whole lives, mate and produce new generations of their kind, all without harboring within their bodies the swarming microbial gardens that have long been considered our inevitable, perhaps even our necessary, internal companions.

This has now been conclusively proved by experiments in the laboratories of bacteriology of the University of Notre Dame, carried out by Prof. James A. Reyniers and his co-workers. From germ-free parent bantam chickens they obtained a germ-free egg. From this egg they hatched a chick—also germ-free. Thus a whole germ-free life-cycle has been completed.

As long ago as 1885, Louis Pasteur, father of scientific bacteriology, pointed out that germ-free animals would be useful for experimental purposes. He speculated upon the possibility of producing germ-free chickens, but doubted if life without germs would be possible. The experiments at Notre Dame have shown this conjecture of Pasteur's to be incorrect.

Germ-Free Life

Earlier work by Prof. Reyniers and his colleagues had shown germ-free life to be possible for a wide variety of animals: mice, rats, guinea pigs, cats, monkeys, as well as chickens. Brought up inside aseptic metal cages, supplied with sterilized food and water and with filtered air to breathe, they remained healthy and contented indefinitely.

But they would not breed. When the mammals mated, no young were born. The chickens laid eggs—which did not hatch. So for a considerable while it was necessary to start each germ-free generation from scratch.

This is possible, though difficult and costly. It depends on one long-known biological fact: that chicks and other birds in their shells, as well as mammalian embryos wrapped in their pre-birth membranes, are normally germ-free. Prof. Reyniers developed an elaborate technique for completely aseptic caesarian operation to produce germ-free mammals. Germ-free chicks presented a simpler problem: sterilize the outside of the shells with suitable chemical solutions, then incubate them in sterile surroundings, and they would hatch out germ-free.

However, it would be better from the viewpoint of cost if germ-free animals could be induced to reproduce their own germ-free offspring, living generation after generation in their carefully sealed-in world.

After many failures, the Notre Dame research group succeeded two years ago in obtaining second-generation germ-free rats. Now they have succeeded again, with chickens. The problem of repeating these successes on a large scale, to obtain any desired number of experimental animals without germs, is primarily one of engineering, and is already well on the way to solution.

Producing and breeding germ-free animals is more than an elaborate and interesting scientific stunt. There is a large field of possible usefulness for such animals, especially in the fields of experimental medicine and nutrition.

For instance, when a researcher has a new variety of germ which he suspects of causing a particular disease, he "puts it through a pig." That is, he injects some of the germs into a guinea pig, or gives it to the little animal in its food or water.

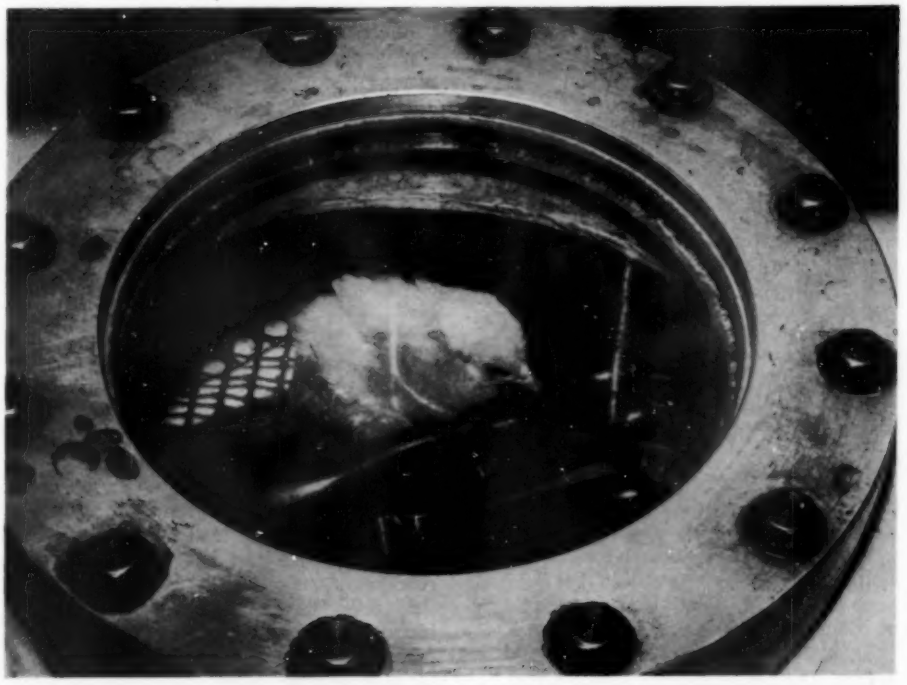
But the guinea pig is already full of other kinds of germs. If his suspected variety fails to have any effect, the experimenter cannot be quite confident in rendering a verdict of "not guilty." The possibility that the new germ's effects are offset by the action of a protective germ already present must always leave a shadow of doubt on his results. But if the experimental animal is germ-free to start with, this doubt can be resolved.

Vitamin Diet

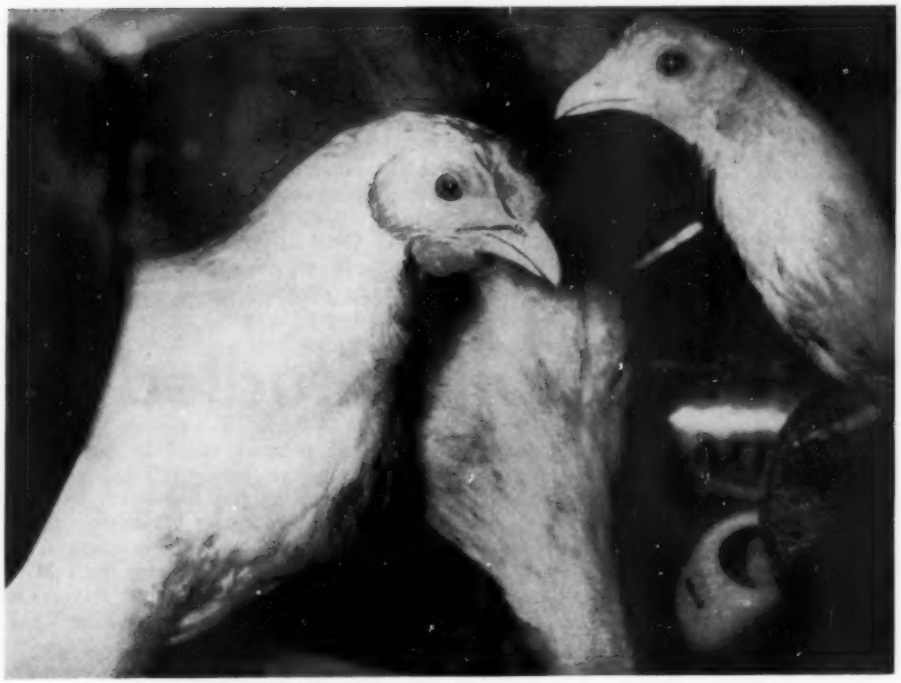
Again, if a nutritionist wants to test a newly discovered vitamin, he may feed a diet containing it (or lacking it) to a white rat. But the rat's digestive tract swarms with germs of a score or more varieties. Perhaps one or more of these will gobble up the vitamin before the rat gets a chance to assimilate it. Or perhaps some of the germs are themselves vitamin-makers—many germs are. The results again are masked, uncertain, unless the test is made with a germ-free animal.

These are only two of the many and varied possible uses of germ-free animals. Research workers from other universities have already beaten a path to the Notre Dame laboratory door. The Office of Naval Research considers the work to be of sufficient long-range significance for our national defense and health to justify the granting of considerable sums toward the partial support of the work.

The cages in which the germ-free ani-



GERM-FREE CHICKEN—Little Innocent is the first chicken to achieve the distinction of second-generation germ-free existence in the Notre Dame bacteriology laboratories.



COMPACT CHICKENS—One of these hens is the mother of Little Innocent. These Wyandotte Bantams make excellent laboratory animals because of their small space and food requirements.

mals are reared at present are hermetically sealed horizontal metal cylinders about the size of a popular washing machine, with germ-tight locks for the introduction and removal of the experimental animals. Windows for observation are gasketed into the wall, and long rubber gloves, similarly gasketed in, permit the operator to reach in and handle the animals without breaking the germ-tight seal. An elaborate network of pipes supplies sterile water, filtered air, and steam for resterilization of the cages between uses.

The new setup, now being prepared for larger-scale production of germ-free animals, is much more spacious, and will permit greater freedom of action on the part of the experimenter.

Nevertheless, space will always be at a premium, so the bacteriologists prefer to use small animals when there is no compelling reason for larger ones. Rats and guinea pigs are chosen rather than rabbits and monkeys.

For the same reason, Prof. Reyniers looked about for vest-pocket-size chickens when he decided to try for second-generation germ-free chicks. Bantams of the White Wyandotte breed proved to be an excellent choice. They not only require much less space than full-sized fowl, but they can live on much smaller portions of the semi-synthetic diet used in the experiments. It is expected that these feathered midgets will be widely adopted as experimental animals.

Science News Letter, November 6, 1948

MEDICINE

Eating May Heat Up Face

➤ EVERY TIME the patient ate, the left side of his face felt warm and sweat poured off it. The strange, one-sided reaction was brought on by eating any food, especially apples. This had been going on for 25 years.

This patient and two others with the same condition were studied by Drs. A. S. Freedberg, Robert S. Shaw and M. J. McManus of Harvard Medical School and Beth Israel Hospital in Boston.

Some patients with this condition get red on one side of the face as well as feeling hot and sweating on that side. Auriculotemporal syndrome is the medical name for the condition.

In the Boston patients, the reaction started in ten to 15 seconds after starting to eat an apple and while still chewing. In one of them, the same reaction was started by chewing a lemon or even paraffin.

Somewhat over 90 cases of this condition have been reported in medical literature and the Boston doctors point out that the condition is not rare and is repeatedly seen in clinics observing patients after

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Do You Know?

A little-known but increasingly important source of table oil is *okra seed.*

Average *potatoes* of today's favorite varieties contain about 15% starch.

Raw foods are good for the teeth because they help clean their surfaces.

Better *sizing,* or surface glaze, of paper results from the use of a new chemical called sodium phospho-aluminate.

Television will be available before the end of the year to the areas where half the people of the United States are living.

Some Maine *sardine canners* are using sunflower oil instead of olive oil because of the better taste.

An important advantage in the use of *magnesium piping* for transferring gasoline is that it will not strike a spark as ferrous metal will.

More than 30,000,000 pounds of *animal livers* are used annually for the production of medicines for the relief of anemia and other diseases.

One reason why *natural gas* is a preferred fuel in steel furnaces is that it contains almost no objectionable constituents and leaves no wastes or residues.

Eggs of fish and other eggs laid in the sea must be produced in enormous numbers if enough are to survive; one oyster sheds around 30,000,000 eggs in a single season.

A giant sound horn is to be tested at an airport to clear away *fogs;* sound waves will jar the fog particles into rain drops, it is expected.

Quartz tube lamps, filled with the rare gas *krypton,* emit beams that will pierce heavy fog for a thousand feet; they are used on the approach lighting system of the new Idlewild airport on Long Island.

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operation on the parotid gland.

Mumps or other infection of the parotid gland as well as operation on it may start the condition. The one-sided sweating while eating is noticed within a few days to three years after the original gland involvement and lasts the rest of the patient's life.

Most likely explanation, the Boston scientists believe, is that the facial sweat glands in contrast to the rest of the body have two sources of nerve supply. When one is injured the other may become active and indeed overactive.

Relief of severe sweating and flushing may be obtained, the Boston scientists suggest, by alcohol injection or surgical cutting of the auriculotemporal nerve. Details of their studies leading to this suggestion appeared in the JOURNAL OF CLINICAL INVESTIGATION (Sept.).

Science News Letter, November 6, 1948

MEDICINE

Siamese Twins Studied

➤ MARY and Margaret, Siamese twins who have furnished entertainment to circus goers, are now giving doctors new light on the cause of high blood pressure.

At the age of 34 Margaret developed high blood pressure, grade 2. Mary had normal blood pressure at rest, although it was unstable and went up at times, though never as high as Margaret's. Detailed studies of these unique sisters are reported by Drs. Stewart H. Jones, Omar Z. Younghusband and James A. Evans, of the Lahey Clinic in Boston, in the JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION (Oct. 30).

The twins are joined at the hips. Their spinal canals communicate. Discovery of this when they were three years old led doctors at that time to decide against trying to separate them by an operation.

The question of separating them now was settled by the twins themselves who flatly refused even to consider it. They feel such a separation would be like having an arm or leg cut off. And the surgeons and orthopedic specialists who examined them at the age of 34 agreed that such an operation was not feasible.

Tests with injections of dyes showed that their blood vessel systems communicate but the degree of exchange of blood in their veins was not determined exactly. It appeared to be moderate.

Mary's slight and Margaret's more severe high blood pressure could be hereditary, since their mother has high blood pressure. Or it may be a result of chronic kidney infection, since Margaret has kidney stones and a past history of kidney infection. A blood-pressure-raising substance from Margaret's diseased kidneys might travel via the blood communication to Mary and raise her blood pressure slightly.

Margaret is a thin, high-strung, nervous type of person, while Mary is stout, calm and placid. Their intelligence quotients are the same but personality tests showed Margaret tending more toward the neurotic than Mary. Margaret's more exaggerated response to a test for blood vessel tone suggests that chronic anxiety and nervous tension probably play more of a part in causing her high blood pressure while in Mary the hereditary and blood chemical factors probably predominate.

Female sex hormones and temperature-raising substances in fevers associated with infections also travel via the blood stream, studies of the twins showed.

Emotional states apparently are not spread by way of the circulation.

Siamese twins, the doctors conclude from their studies of Mary and Margaret, probably develop from two separate ova and not, as frequently supposed, from a single ovum, or egg cell.

Science News Letter, November 6, 1948

MEDICINE

Irritation from Smoking

➤ THE THROAT irritation caused by smoking cigarettes cannot be told from the irritation caused by various bacteria, chemicals and heat, the JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION (Oct. 30) states in an editorial.

"It would be a wise physician indeed who could differentiate" between the two, is the way the journal puts it.

Cigarette advertising on the basis that the product advertised does not irritate the throat is "approaching a point where the advertising is no longer significant," the journal states.

Besides the impossibility of telling whether the throat irritation is due to cigarettes or to something else, the methods for measuring throat irritation are not standardized.

"Further truly scientific studies and respect for intelligent advertising," the journal says, would do away with the need for more trials before the Federal Trade Commission to determine whether cigarette advertising claims are justified or not.

The manufacturers of cigarettes are reminded by the journal of the "trend in the promotion of alcoholic liquors and their abuse" which finally led to prohibition. Re-

strictive legislation against cigarettes may come, the journal warns, unless the industry undertakes voluntary policing restriction.

The A. M. A. JOURNAL, like many other medical publications, carries cigarette advertising. This brings in about a dozen protests per year from physicians. On the health aspects of cigarette smoking, the journal says the following:

"Actual surveys indicate that the majority of physicians themselves smoke cigarettes. Extensive scientific studies have proved that smoking in moderation by those for whom tobacco is not specifically contraindicated does not appreciably shorten life. Postmortem examinations do not reveal lesions in any number of cases that could be definitely traced to the smoking of cigarettes. From a psychologic point of view, in all probability more can be said in behalf of smoking as a form of escape from tension than against it. Several scientific works have been published that have assembled the evidence for and against smoking, and there does not seem to be any preponderance of evidence that would indicate the abolition of the use of tobacco as a substance contrary to the public health."

Science News Letter, November 6, 1948

DENTISTRY

Mouthwash Cuts Decay

➤ A MOUTHWASH has been devised by a Philadelphia dentist that has reduced dental decay on an average of 75% in a group of his patients.

Formula for this caries-preventive is: 40 grams of sodium alkyl aryl sulfonate, a synthetic detergent; 80 grams of carbamide or urea; one-eighth of an ounce of flavoring; and one grain of color to one gallon of pure water.

Dr. David J. Goodfriend, in a report to the JOURNAL OF THE AMERICAN DENTAL ASSOCIATION (Nov. 1), states that the mouthwash cleans the teeth and penetrates between them where food particles may be lodged, prevents the formation of decay-producing acid in carbohydrate food particles and neutralizes acids that may be formed.

For the home care of the mouth and teeth he recommends that a mouthful of the mouthwash be swished around and between the teeth for one minute after eating and after toothbrushing.

The mouthwash stops bleeding in addition to its preventive action. Dr. Goodfriend points out this is an aid to dental surgical procedures.

"In a manner which I do not understand," he states, "it will stop bleeding without soiling or contaminating the field as most hemostatic agents do. Held in the mouth for three to five minutes after tooth extraction, it usually completely controls bleeding and leaves an uninjured wound full of clotted blood. Sprayed on bleeding gingivae (gums) during scaling or cavity preparation, it controls the bleeding and cleans the operative field."

Dr. Goodfriend discovered the effectiveness of his mouthwash after treating 186 of his patients who were especially susceptible to tooth decay. They had abnormalities of bite which required that fixed bite overlays be placed on the teeth for from six months to two years. This device collected many particles of food which encouraged dental decay.

For contrast, Dr. Goodfriend compared the 186 patients receiving the mouthwash with a group treated for the same condition without the mouthwash. In the first group the incidence of caries was reduced by 55% to 95%. "In the control group there was such a high incidence of caries that it interfered with treatment of the bite and frequently caused the loss of teeth," he points out.

This work was done under the auspices of the Edward C. Kirk Research Fund of the University of Pennsylvania.

Science News Letter, November 6, 1948

METEOROLOGY

Rain-Making with Fire

See Front Cover

➤ SILVER IODIDE smoke particles, created by fire in special burners, give promise as tools for artificial snow and rain makers. In this they may replace dry ice and other substances successfully used during the past year.

Artificial snow-making by the dry-ice method is actually two years old but was first a laboratory process. Later snow was made in super-cooled clouds high above the earth by distributing in them finely-divided solidified carbon dioxide particles from an airplane. The particles become the nuclei of snowflakes.

The experiment has been tried out several times during the past year in various parts of the United States and under various weather conditions. A degree of success was achieved. Other materials besides dry ice have been tried but this is probably the first time that fire has been employed to generate smoke for snow-making.

The dry-ice method of making artificial snow is credited to Dr. Vincent J. Schaefer,

SCIENCE AT WAR

By **J. G. CROWTHER**
Chairman, Association of British Science Writers

and

R. WHIDDINGTON
Head, Dept. of Physics, University of Leeds

THE first detailed account of science's contribution to the war effort, based on the official archives and documents assembled by the Scientific Advisory Committee to the British Cabinet. Because of the close and intimate collaboration between the American and British forces during World War II, this volume is of fundamental interest to the American scientist, as well as to the intelligent layman interested in science.

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General Electric scientist. The silver iodide technique is the work of Dr. Bernard Vonnegut, shown on the cover of this week's SCIENCE NEWS LETTER, also of General Electric. His generators for the smoke particles have been laboratory tested thus far, but they are expected to undergo extensive experimentation in actual weather conditions in the near future. The air tests will be made by the U. S. Army Signal Corps and the Office of Naval Research.

Among the silver iodide smoke generators developed are two charcoal-burning units, one for use on the ground and one for use on a plane, and a hydrogen-burning unit. The charcoal burners use a special charcoal impregnated with silver iodide and emit thousands of sparks, each of which produces millions of silver iodide particles.

The ground-based hydrogen burner is described as similar to an ordinary paint sprayer, except that hydrogen is used instead of compressed air and a spray solution of silver iodide and sodium iodide in acetone is substituted for the paint. When the hydrogen is ignited, the flame vaporizes the silver iodide spray. This vapor condenses into minute silver iodide particles, which stream out into the atmosphere.

Science News Letter, November 6, 1948

GENERAL SCIENCE

Young Scientists Wanted

➤ MORE THAN 50 industrial scientists are joining in a statewide search for science-talented boys and girls in Virginia. The industrial scientists will go directly to high schools in the state to find seniors who show promise of becoming scientists and give them first-hand encouragement and assistance.

Dr. Frank C. Vilbrandt, head of the department of chemical engineering at the Virginia Polytechnic Institute in Blacksburg, Va., announced that prominent scientists may be secured as speakers for school assemblies or science club meetings from such industrial firms as Newport News Shipbuilding and Dry Dock Company, Virginia-Carolina Chemical Corporation, Merck & Company, Inc., American Viscose Company, Norfolk and Western Railway Company and from the laboratories of Virginia Polytechnic Institute, Hollins College and the University of Virginia.

This latest innovation in locating science talent is part of a long-range program of the Virginia Academy of Science which is conducting a Virginia Science Talent Search for the fourth consecutive year. The dozens of able boys and girls, thereby located and given financial assistance to further their education in science, have aroused the interest of many colleges, universities and industries in the state. Other companies and institutions which will supply speakers will be announced later.

Boys and girls still in high school can now hear up-to-the-minute information about such subjects as atomic energy, insects, penicillin, photosynthesis, ultrasonics, genetics or fiber photomicrography. Many of the speakers will use slides, films or demonstrations. For students who want vocational guidance their principal may request a speaker to explain "How to Select a Scientific Profession," "What Industry Expects of a Chemist" or "Job Possibilities for Scientists in Virginia."

Dr. Sidney Negus, president of the Virginia Academy of Science, declared, "Finding and helping the boys and girls with science talent is the most important work of our Academy." Dr. Negus is one of the originators of the State Science Talent Search plan tried first in Virginia and now being copied by 15 other states.

All state Searches run concurrently with the Eighth Annual Science Talent Search for the Westinghouse Science Scholarships by special arrangement with Science Clubs of America, administered by Science Service. The closing date for entries in the state and National Science Talent Searches is Dec. 27, 1948.

Science News Letter, November 6, 1948

MEDICINE

"Sound-Conditioned" Cats Aid Treatment of Disease

➤ "SOUND-CONDITIONED" monkeys and cats may help toward better treatment for Meniere's disease.

This condition is characterized by attacks of violent dizziness, which are often disabling, and gradual loss of hearing with noise or ringing in the ear. Medical treatment is often tried for this condition. It can be cured by an operation in which the vestibular branch of the hearing nerve within the skull is divided. This branch of the nerve carries impulses of equilibrium from the semicircular canals within the ear. After this operation, the dizzy attacks are banished and the hearing may be definitely better but it is not always completely restored.

A simpler operation is one in which the electrocautery is used to destroy parts of the semicircular canals. This, however, destroys hearing in most cases. With the aid of the sound-conditioned animals, Dr. John R. Lindsay of the University of Chicago is now trying to refine this operation to the point where hearing can be saved but the canals destroyed to banish the dizzy spells. He described his studies to the American Academy of Ophthalmology and Otolaryngology meeting in Chicago.

The animal is trained, or conditioned, to associate each of a series of pure tones with an event such as a puff of wind that ruffles its fur or a mild electric shock that causes it to lift a paw. When the conditioning is complete, an operation is performed like that intended for human ears. The sound-conditioned animal then can tell the surgeon how much hearing, and for what tones, has been saved.

Science News Letter, November 6, 1948

MEDICINE

Vitamin B_{12} Promising in Anemia Complication

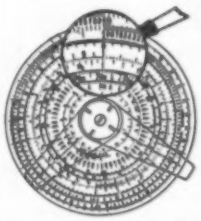
➤ HOPE that a vitamin may remedy the spinal cord complication of pernicious anemia appears in results of research by Drs. Tom Spies and Robert E. Stone of Northwestern University Medical School, Chicago.

The vitamin, B_{12}, has been recently isolated and is still hard to obtain. The amount available is so small that complete evaluation of its effectiveness cannot yet be made and the studies are still going on.

So far Drs. Spies and Stone have been able to treat only seven patients with it. But in all seven symptoms improved and some of the abnormal physical findings were reversed.

The condition for which this vitamin shows promise is known medically as subacute combined degeneration of the spinal cord. Symptoms include great pain, tingling and numbness of feet, legs, fingers and arms, and finally paralysis. No other chemical substance has ever given relief from it.

Science News Letter, November 6, 1948



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Books of the Week

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THE AUTOBIOGRAPHY OF BENJAMIN RUSH: His "Travels Through Life" together with his Commonplace Book for 1789-1813—George W. Corner, Ed.—*American Philosophical Society (Princeton University Press)*, 399 p., illus., $6.00. An important historic document is this compilation of the writings of a notable patriot and physician whose thirst for knowledge in widely varied fields caused him to set down a tremendous number of interesting facts.

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE: A Brief History of the Association From Its Founding in 1848 to 1948, Its Present Organization and Operation, Summarized Proceedings for the Period from January, 1940 to January, 1948 and a Directory of Members as of December 31, 1947—*AAAS*, 1219 p., $8.50 members, $9.50 nonmembers.

THE CITRUS INDUSTRY, VOLUME II: PRODUCTION OF THE CROP—Leon Dexter Batchelor and Herbert John Webber, Eds.—*University of California Press*, 933 p., illus., $10.00. A book for fruit growers with each chapter written by an author with special knowledge of the subject.

THE CYTOPLASM OF THE PLANT CELL—Alexandre Guilliermond—*Chronica Botanica*, 247 p., illus., $5.00. The work of a French author translated by Dr. Lenotte Rogers Atkinson.

MAGIC IN A BOTTLE—Milton Silverman—*Macmillan*, 2d ed., 386 p., $3.50. Romantic stories behind the development of modern drugs and remedies.

MANUAL OF ARCHAEOLOGICAL SURVEYING—A. Henry Detweiler—*American Schools of Oriental Research*, 129 p., illus., $1.75. A reference work for archaeologists and excavators which will enable them to express their descriptions of findings with greater exactness and to understand one another.

MARCHING WITH THE GRASSES—Raymond J. Pool—*University of Nebraska Press*, 210 p., illus., $3.50. Much of the food that we depend on for life is derived from grass. This work is intended to give the general reader an appreciation of the vital and global importance of the grasses.

ORGANIC REACTIONS, VOLUME IV—Roger Adams, Ed.—*Wiley*, 428 p., $6.00. This is a standard work issued in succeeding volumes, each chapter written by an expert and giving a comprehensive survey of a particular reaction.

PHYSICO CHEMICAL EXPERIMENTS—Robert Livingston—*Macmillan*, rev. ed., 267 p., illus., $3.50. A text for courses in physical chemistry. The revision involved no major changes.

PLENTY OF PEOPLE: The World's Population Pressures, Problems, and Policies and How They Concern Us—Warren S. Thompson—*Ronald*, rev. ed., 281 p., illus., $3.50. The director of the Scripps Foundation for Research in Population Problems believes that England, Germany and Italy already have more people than is desirable, while China, Japan and India as well as other parts of Asia can only look forward to the most distressing poverty until they learn to control their population growth.

PROJECTIVE TECHNIQUE: A Dynamic Approach to the Study of the Personality—John Elderkin Bell—*Longmans*, 533 p., $4.50. A text and reference book covering word-association tests, Rorschach, TAT, Rosenzweig, Szondi, psychodrama and other modern methods of studying personality through projective techniques.

THE ROLE OF UPROOTED PEOPLE IN EUROPEAN RECOVERY—Jane Perry Clark Carey—*National Planning Association*, 85 p., illus., paper, $1.00. Accompanied by a "Program Guide for Discussion" prepared by the American Friends Service Committee.

THE STORY OF BLOOD—John H. Glynn—*Wyn*, 285 p., $3.00. A popularly written book by a bacteriologist.

TUBEROUS BEGONIAS: A Complete Guide for Amateur and Specialist—Worth Brown—*Barrows*, 128 p., illus., $2.75. Especially for the home gardener and enthusiast.

Science News Letter, November 6, 1948

MEDICINE

Cancer Remedies May Come From Natural Compounds

➤ ONE KIND of cancer in rats can be made to regress within a week by chemicals extracted from malt extract and wheat middlings, Drs. T. B. Heaton and G. M. Robinson of the University of Oxford announce in the British scientific journal, NATURE (Oct. 9).

Their report does not suggest any application to human cancer. American cancer researchers point out that any number of compounds will slow down the growth of cancers in laboratory animals, but such compounds have proved disappointing as possible remedies for human cancer.

Hope continues, however, that some naturally occurring compound, from plant or animal sources, may prove effective against this disease.

The chemicals from wheat and malt may be the same. The wheat middlings one can be converted to another chemical of the aldehyde class. All three of these, in small doses, stop the growth of rats. This effect starts as soon as the chemical is given and stops as soon as the scientists stopped giving the chemical.

But when the chemicals are given in the much larger dose necessary to cause the cancer to regress, they do not stop the growth of the rats. On the contrary, the chemicals seem in the big doses to speed growth in terms of weight gains.

It was the growth-arresting effect of various substances from plants and yeast and of some pure chemicals which years ago started the scientists on their search.

Science News Letter, November 6, 1948

A New Book
on the
Ever Important Question of

MINERAL NUTRITION OF PLANTS AND ANIMALS

By Frank A. Gilbert
Battelle Memorial Institute

WHAT causes low crop production, abnormally developed plants? "Hairless" hogs? Lean livestock? How can men eat "good" meals—and still be undernourished? Animals cannot be healthy without receiving nutritious forage; and the forage, to have the proper quality, must come from soil containing the needed mineral constituents, as must all plants used for food—the final consideration being their nutritive value to man.

Mineral deficiencies in human beings—which often lead to the condition described as "hidden hunger"—result from the consumption of this inadequately fortified food, vegetable, animal, or both.

This survey discusses many books and articles dealing with mineral nutrition and is a noteworthy addition to the mounting literature on the values of trace elements to plants and animals. It classifies mineral elements in nutrition and presents a sketch of the early history of plant nutrition—from Aristotle to Liebig.

An important adjunct to source material in the field of nutrition, it serves as a foundation for more intensive research in seeking better food for the health of the nations. Fully documented with illustrations and an excellent bibliography.

CHAPTERS

Early History of Plant Nutrition
Classification of the Elements Used in Nutrition

Phosphorus
Calcium
Magnesium
Potassium
Sulfur
Iron
Copper
Cobalt
Manganese
Zinc
Iodine
Boron
Molybdenum
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WARM-AIR FURNACE, a coal burner that can be easily converted for firing with gas or oil, has a stainless steel combustion chamber and is one of the first coal-fired heaters to use this material which increases service life. Blowers and an induced draft fan for the heater are mounted on a single shaft, powered by a single motor.

Science News Letter, November 6, 1948

BLOOD COUNT MICROSCOPE, which automatically counts red and white blood cells and hemoglobin with speed and accuracy, is a simple instrument that can be operated without special training or technical knowledge. A photoelectric eye counts and averages all the corpuscles on a given area of the counting chamber and records the results on a meter.

Science News Letter, November 6, 1948

SPECIALTY TOOL, for hard-to-reach parts and places, consists of a flexible cable shaft encased in a flexible housing tube which can be curved as desired to work around corners or S-turns. The shaft has expanding and retracting fingers, operated by thumb pressure applied at the opposite end, to grip a hard-to-get-at object.

Science News Letter, November 6, 1948

SELF-BREATHING APPARATUS for firemen, shown in the picture, is for use in smoky fires and gas-filled rooms where oxygen is not otherwise available. The breathing bag, which fits over the chest, contains a canister of potassium tetraoxide which generates oxygen when activated by moisture from the breath.

Science News Letter, November 6, 1948

SELF-OPENING VALVE, for use on aviator's oxygen cylinders, permits the oxygen line to become pressurized immediately when the valve is attached. Flow is regulated by a control valve in the line near the pilot. When the coupling is disconnected from the cylinder valve, oxygen flow is automatically cut off.

Science News Letter, November 6, 1948

MEASURING INSTRUMENT for lacquer deposits on engine pistons contains two high-voltage terminals, one of which is attached to the piston and the other placed touching the lacquer deposit. The instrument measures the amount of voltage required to burn through the lacquer.

Science News Letter, November 6, 1948

NON-TIPPABLE "WALKER," an improved type designed to help disabled patients learn to walk, has a wide metal frame with adjustable arm-rests and is so built that a patient can maneuver his wheel-chair into position and pull himself up to a walking position without help.

Science News Letter, November 6, 1948

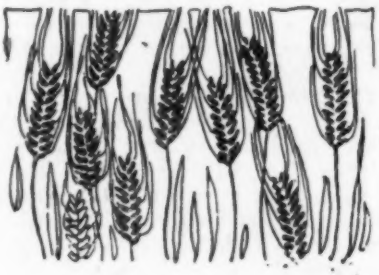
• Nature Ramblings *by Frank Thone* •

PRACTICALLY all of the plants we depend on to supply staple foods for ourselves, feed for our animals and fibers for clothing and other fabrics complete their life cycles from planting to harvest in a single growing season. All the grains, most vegetables and all melons, as well as sugarbeets, soybeans, cotton and linen are annual crops.

There are certain definite advantages to this year-by-year farming. For one thing, it offers flexibility in planning, for the farmer who has a choice of crops to grow and a rotation schedule to maintain does not need to commit any given field for more than one season at a time. Also, since our principal foods are either seeds, roots or tubers, it is natural to turn to plants that produce these in largest quantity, and these plants are either annuals like the grains and legumes or biennials like sugarbeets and cabbage, that are harvested before they finish their life cycles.

However, there is one great offsetting

Needed: Perennial Crops



disadvantage to year-by-year farming—so great that it has become an agronomic nightmare. These crops that have to be planted every year naturally require that the soil be plowed every year, and in many cases also demand several surface stirrings afterwards, to kill competing weeds. This means soil that is naked or nearly so almost all the time, inviting deadly erosion by wind and water.

It would be a great advantage if some of our staple crops could be perennials like the grass in our best pastures. A few of our hay crops are, notably alfalfa; but these are usually handled on a relatively short-term basis, not more than three or four years from planting to plowing-up, as a rule.

Perennial wheat varieties have long been a goal of agronomists. Usually the effort to obtain them is made by crossing a winter wheat with a related longer-lived wild grass such as quackgrass. Such crosses made in this country and Canada have resulted in hybrids more valuable as range grasses than for grain. Just before the war two Soviet breeders named Tsitsin and Derzhavin reported production of short-lived perennial (triennial) wheat varieties with good grain yield. What happened to these is not known; perhaps the war interfered with their general distribution. At any rate, the main wheat crop, in Russia as elsewhere, is still on the old year-to-year basis.

Science News Letter, November 6, 1948